US008834049B2

(12) **United States Patent**
Kurashina

(10) **Patent No.: US 8,834,049 B2**
(45) **Date of Patent: Sep. 16, 2014**

(54) **PRINT SYSTEM, PAPER PRINTER, AND METHOD OF CONTROLLING PRINT SYSTEM**

(75) Inventor: **Hiroyasu Kurashina**, Matsumoto (JP)

(73) Assignee: **Seiko Epson Corporation**, Tokyo (JP)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 1798 days.

(21) Appl. No.: **11/838,689**

(22) Filed: **Aug. 14, 2007**

(65) **Prior Publication Data**

US 2008/0053324 A1 Mar. 6, 2008

(30) **Foreign Application Priority Data**

Aug. 31, 2006 (JP) 2006-236784

(51) **Int. Cl.**

B41J 11/20	(2006.01)
B65H 3/06	(2006.01)
B41J 3/407	(2006.01)
B41J 33/06	(2006.01)
B41J 33/14	(2006.01)
B41J 13/00	(2006.01)
B41J 13/02	(2006.01)
B41J 13/10	(2006.01)

(52) **U.S. Cl.**

CPC ***B41J 33/06*** (2013.01); ***B65H 3/0623*** (2013.01); ***B41J 3/4075*** (2013.01); ***B41J 33/14*** (2013.01); ***B41J 13/0027*** (2013.01); ***B41J 13/025*** (2013.01); ***B41J 11/20*** (2013.01); ***B41J 13/103*** (2013.01)

USPC **400/649**; 400/663

(58) **Field of Classification Search**

CPC B41J 33/06; B41J 33/14; B41J 13/025; B41J 11/20; B41J 3/407; B41J 13/00; B65H 2701/1934; B65H 3/0623

USPC 400/649, 76, 624, 625, 663, 660.2, 664

IPC B41J 33/54

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,618,062	A *	4/1997	Mertens et al.	283/67
5,681,123	A *	10/1997	Yamaguchi	400/586
2004/0234314	A1 *	11/2004	Tozaki et al.	400/120.01
2005/0208250	A1 *	9/2005	Blank et al.	428/40.1

FOREIGN PATENT DOCUMENTS

JP	05050729	A *	3/1993
JP	08174881	A *	7/1996

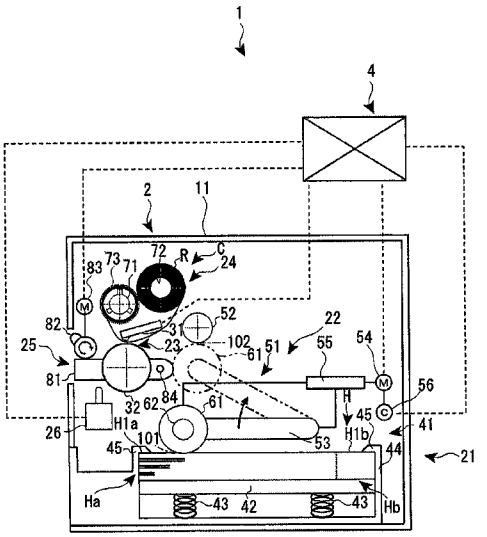
(Continued)

Primary Examiner — Judy Nguyen
Assistant Examiner — Jennifer Simmons
(74) *Attorney, Agent, or Firm* — DLA Piper LLP (US)

(57) **ABSTRACT**

A print system includes a paper feed device; a print device which has a platen roller and a print head and inserts the fed paper and an ink ribbon at a head position between the platen roller and the print head to perform printing; a disjunction device which relatively moves the platen roller with respect to the print head between a contact position where the platen roller contacts and a separation position where the platen roller is away therefrom; a non-print section acquiring device which acquires non-print section data of a character image in a feed direction of the paper from print data; and a print control device which controls the devices. The print control device relatively moves the platen roller to the separation position during a non-print section of the fed paper passes through the print head, based on the non-print section data.

11 Claims, 11 Drawing Sheets



(56) **References Cited**

FOREIGN PATENT DOCUMENTS

JP	09123495 A	5/1997	JP	2003-011437	1/2003
			JP	2003011437 A *	1/2003
			JP	2004017609 A *	1/2004

* cited by examiner

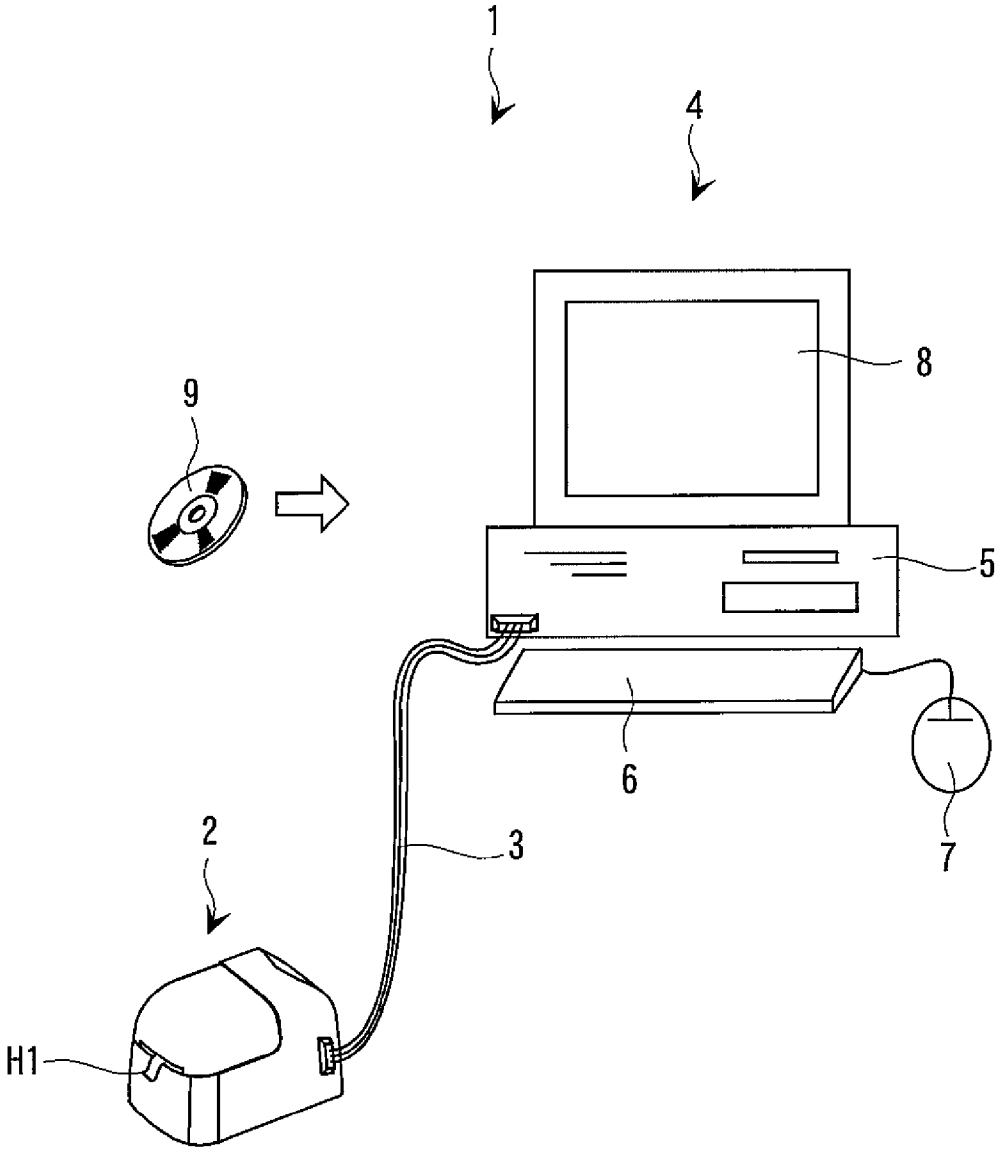


Fig. 1

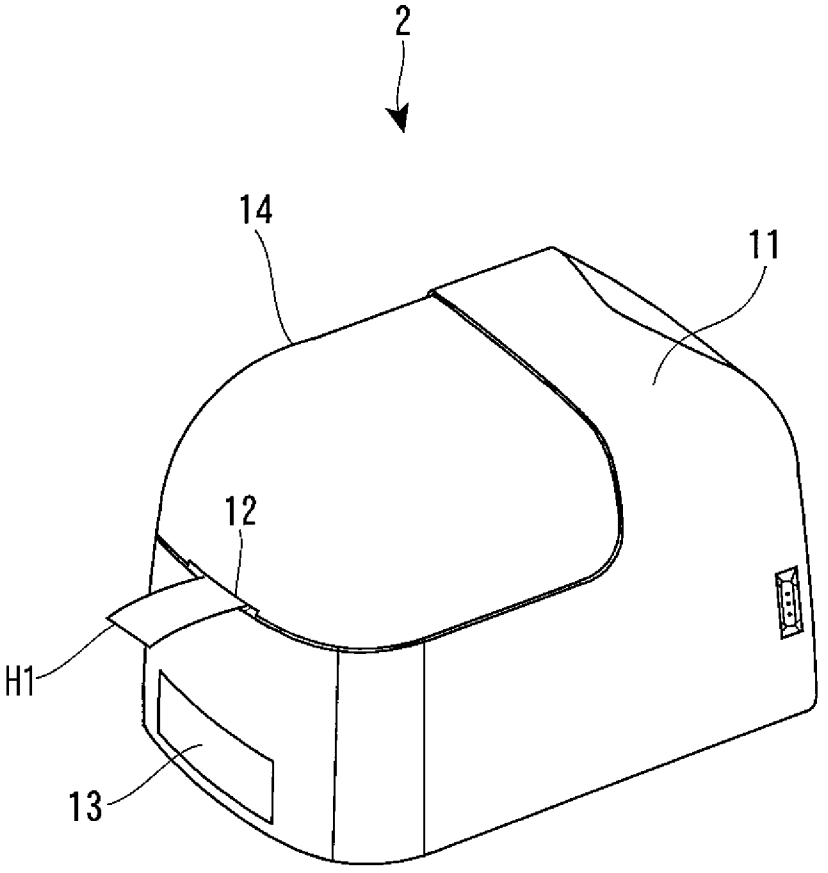


Fig. 2

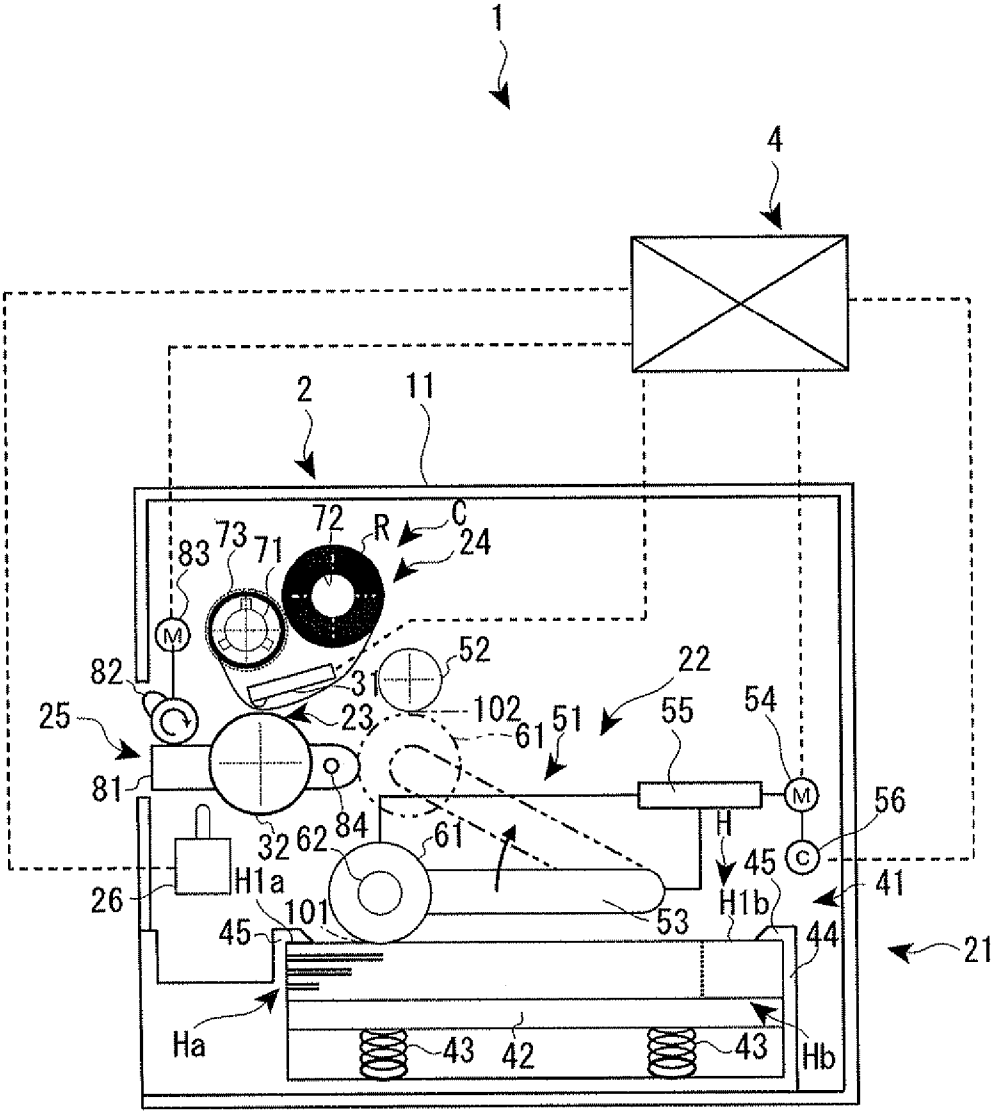

1
4
2
11
72
R
C
24
73
71
83
M
52
31
22
82
23
102
61
51
55
54
25
81
84
56
H
32
62
61
45
C
41
H1a
H1b
26
101
53
44
45
21
Ha
43
42
43
Hb

Fig. 3

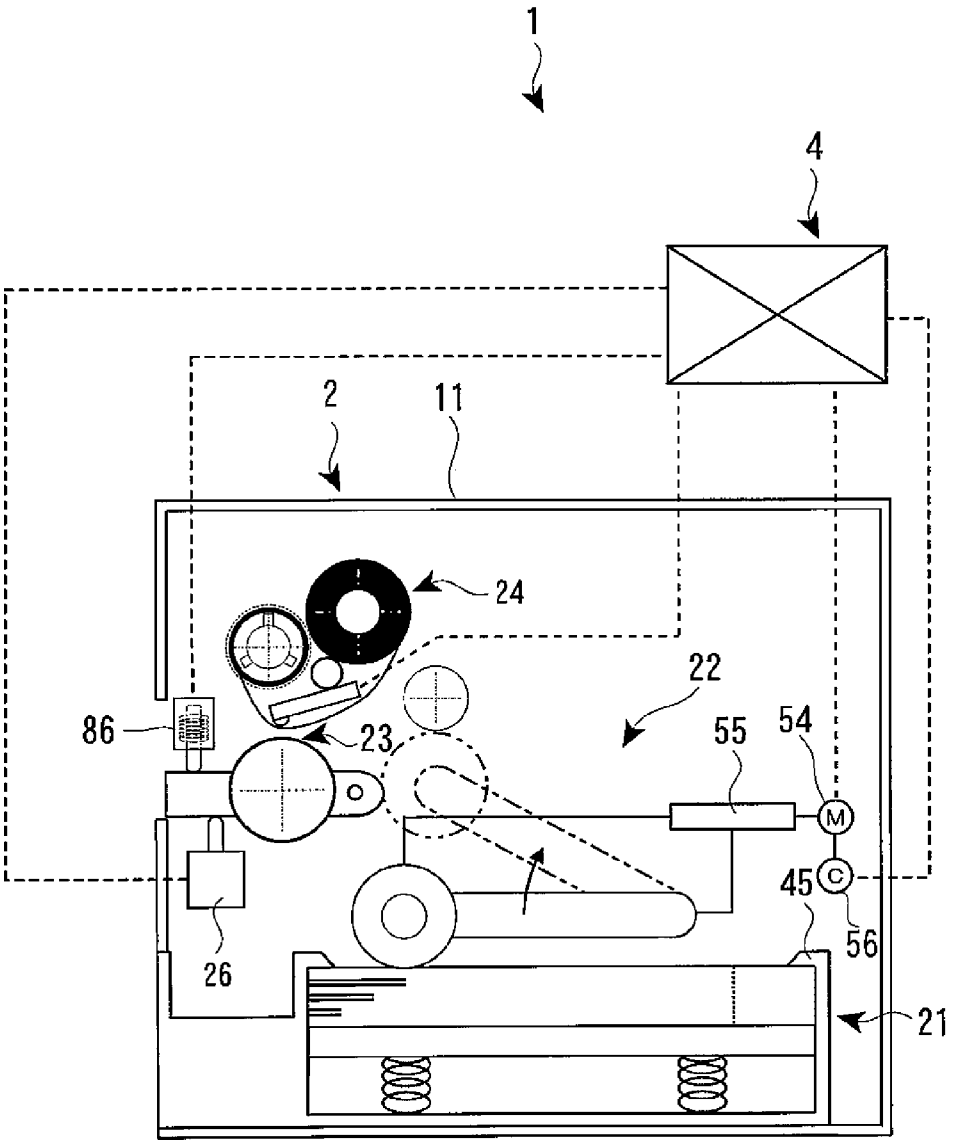


Fig. 4

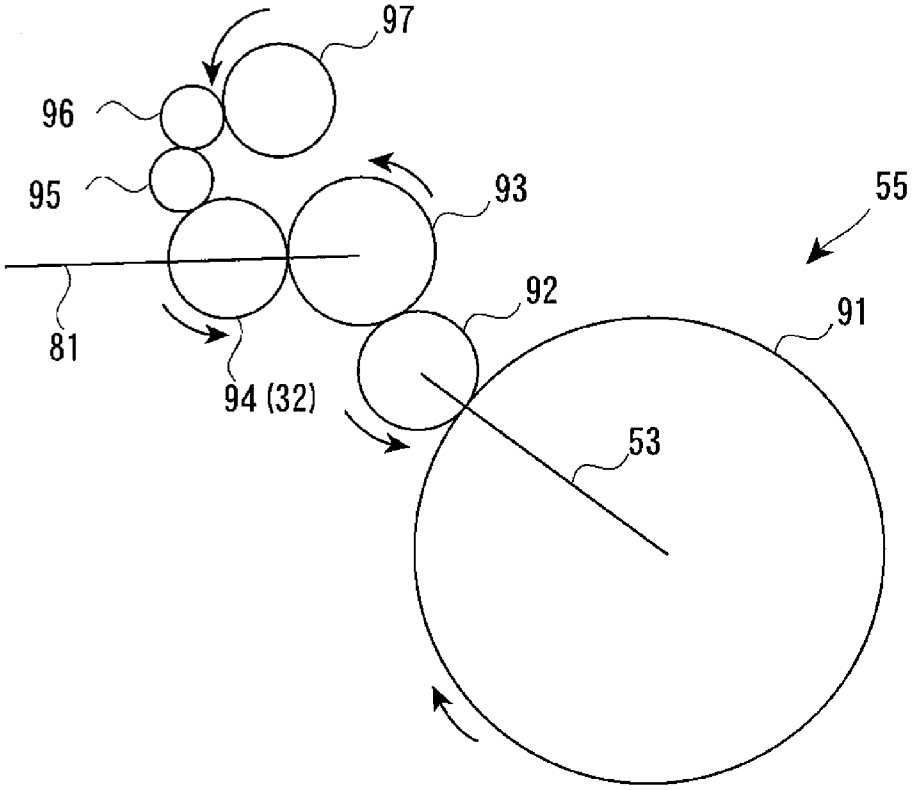


Fig. 5A

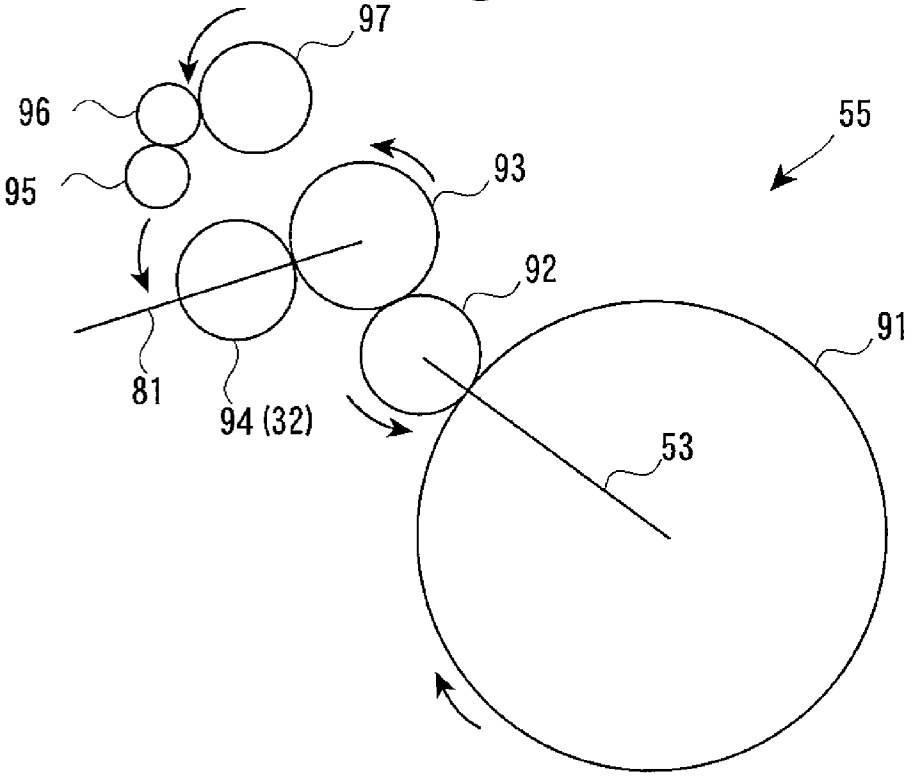


Fig. 5B

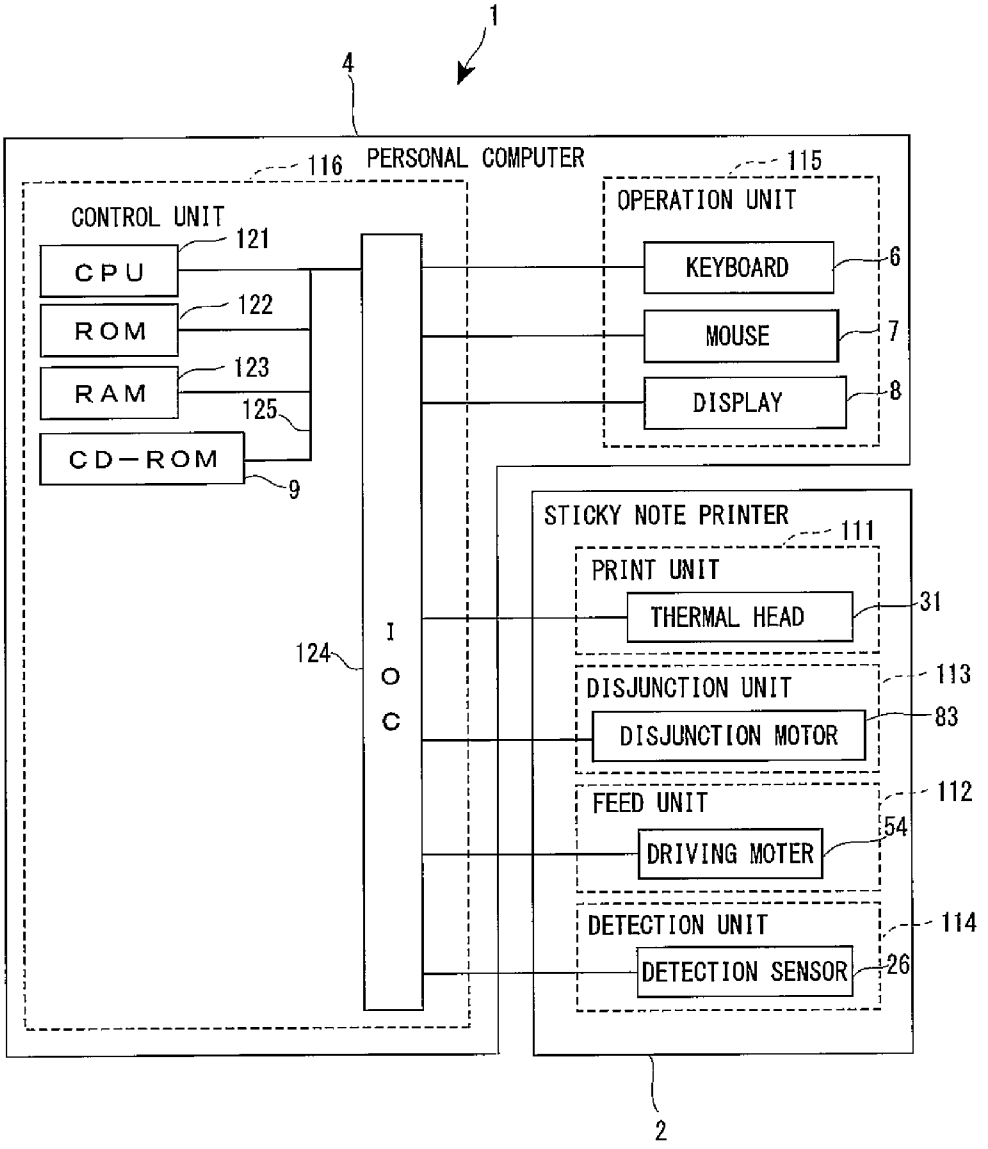

1
4
116 PERSONAL COMPUTER
115
OPERATION UNIT
CONTROL UNIT
121
CPU
122
ROM
123
RAM
125
CD-ROM
9
KEYBOARD
6
MOUSE
7
DISPLAY
8
STICKY NOTE PRINTER
111
PRINT UNIT
THERMAL HEAD
31
124
I
O
C
113
DISJUNCTION UNIT
DISJUNCTION MOTOR
83
112
FEED UNIT
54
DRIVING MOTER
114
DETECTION UNIT
DETECTION SENSOR
26
2

Fig. 6

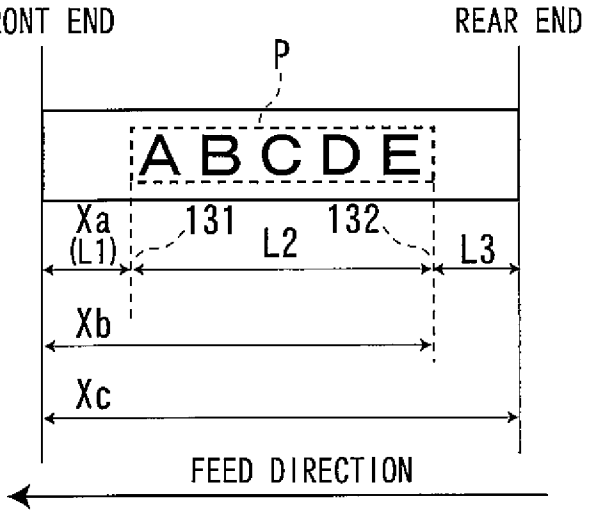

FRONT END
REAR END
P
A B C D E
Xa
(L1)
131
L2
132
L3
Xb
Xc
FEED DIRECTION

Fig. 7A

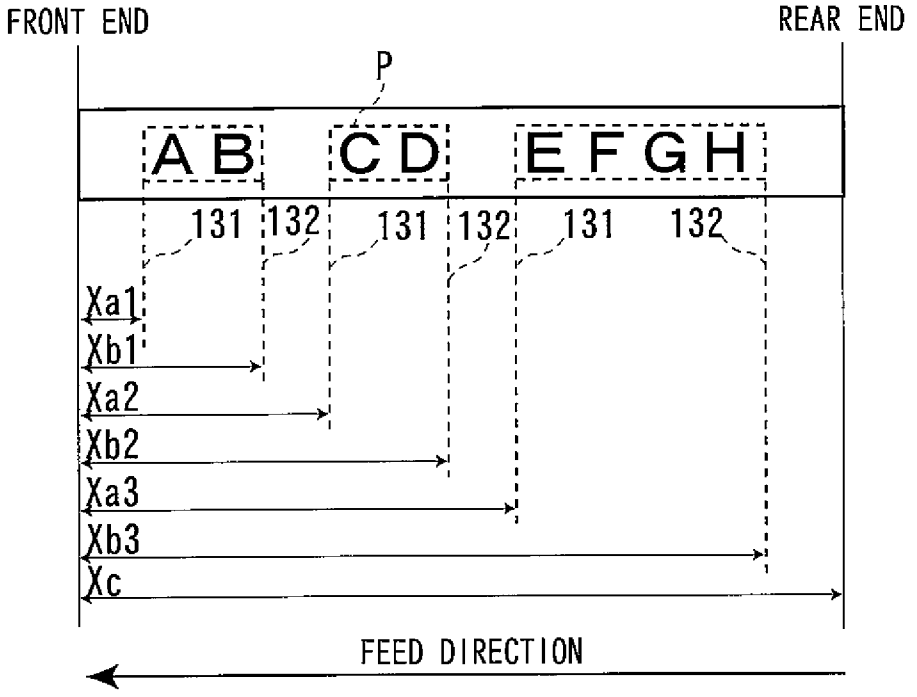

FRONT END
REAR END
P
A B
C D
E F G H
131
132
131
132
131
132
Xa1
Xb1
Xa2
Xb2
Xa3
Xb3
Xc
FEED DIRECTION

Fig. 7B

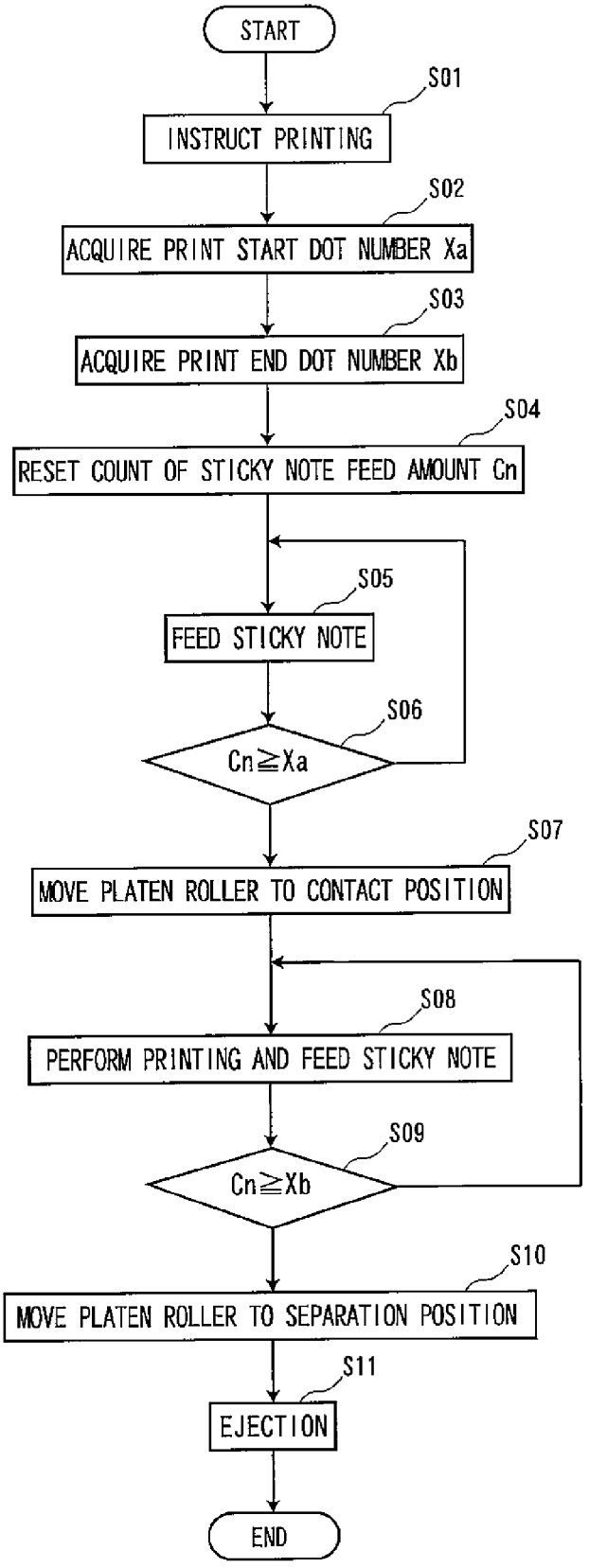

START
S01
INSTRUCT PRINTING
S02
ACQUIRE PRINT START DOT NUMBER Xa
S03
ACQUIRE PRINT END DOT NUMBER Xb
S04
RESET COUNT OF STICKY NOTE FEED AMOUNT Cn
S05
FEED STICKY NOTE
S06
Cn≧Xa
S07
MOVE PLATEN ROLLER TO CONTACT POSITION
S08
PERFORM PRINTING AND FEED STICKY NOTE
S09
Cn≧Xb
S10
MOVE PLATEN ROLLER TO SEPARATION POSITION
S11
EJECTION
END

Fig. 8

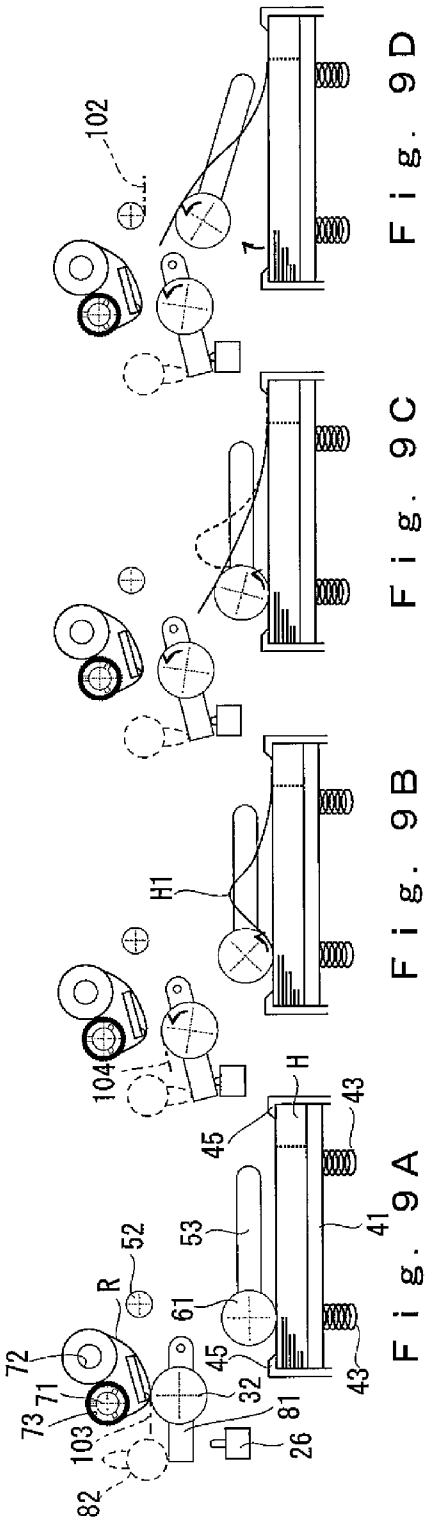


Fig. 9A

Fig. 9B

Fig. 9C

Fig. 9D

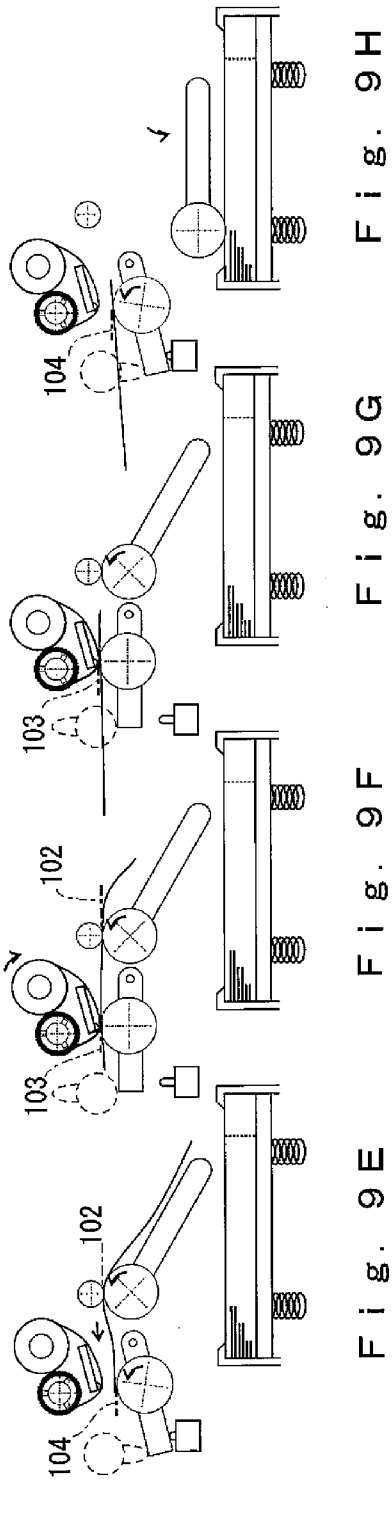


Fig. 9E

Fig. 9F

Fig. 9G

Fig. 9H

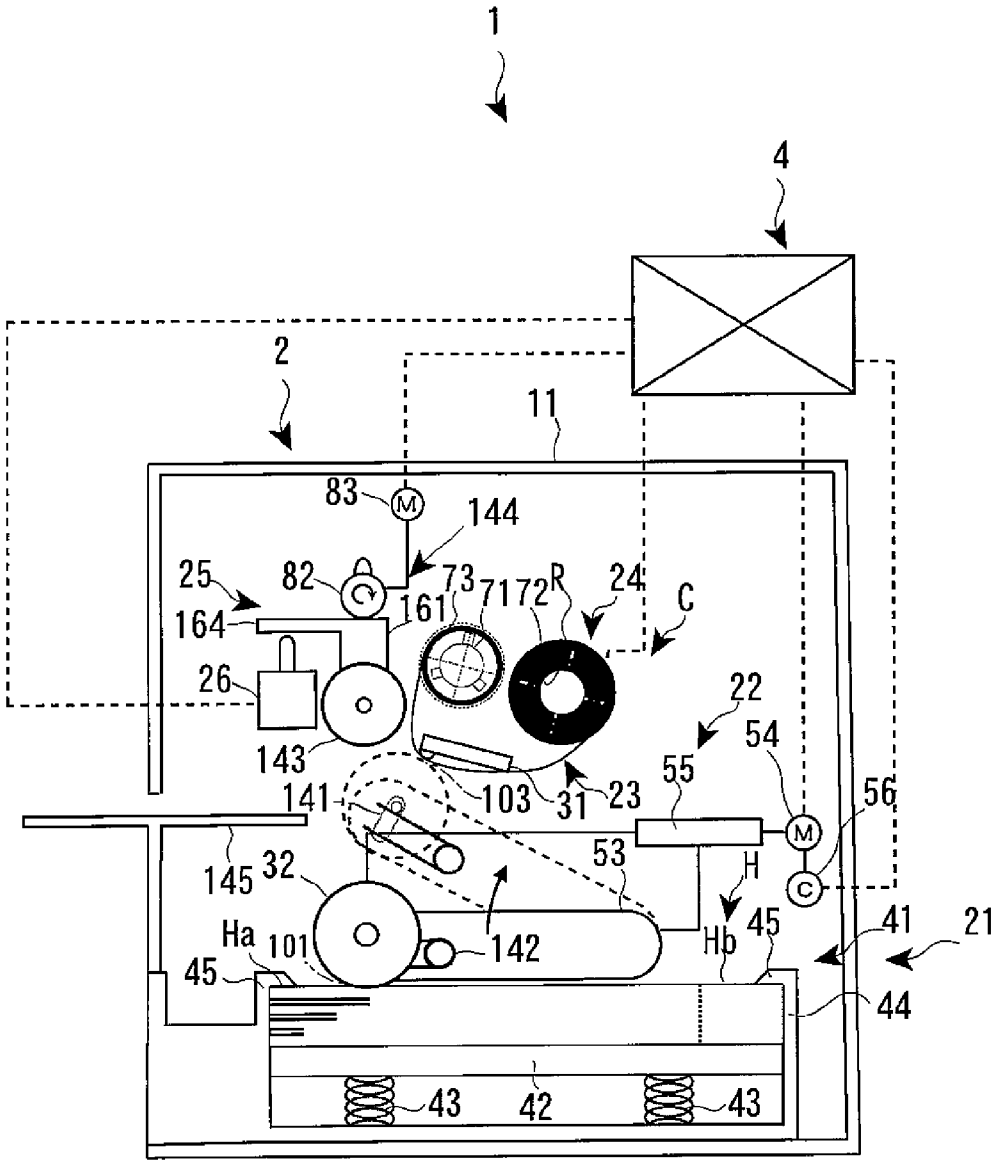

1
4
2
11
83
144
25
82
73
7172
R
24
C
164
161
26
143
22
54
55
56
141
103
31
23
145
32
53
H
Ha
101
142
Hb
45
41
21
44
43
42
43

Fig. 10

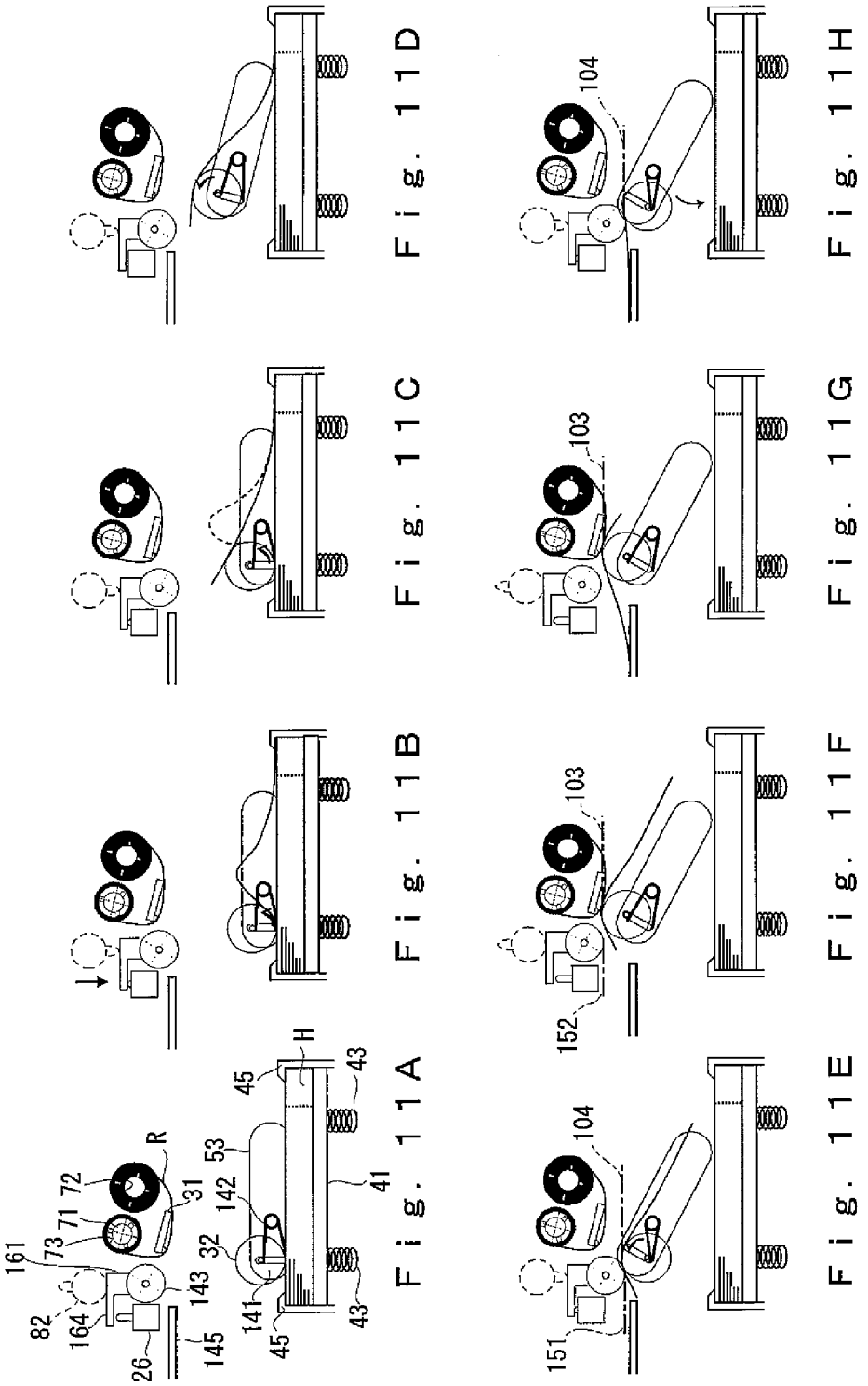


Fig. 11A Fig. 11B Fig. 11C Fig. 11D

Fig. 11E Fig. 11F Fig. 11G Fig. 11H

PRINT SYSTEM, PAPER PRINTER, AND METHOD OF CONTROLLING PRINT SYSTEM

The entire disclosure of Japanese Patent Application No. 2006-236784, filed Aug. 31, 2006, is expressly incorporated by reference herein.

BACKGROUND

1. Technical Field

The present invention relates to a print system for performing printing on a paper via an ink ribbon while feeding the paper and the ink ribbon together, a paper printer, and a method of controlling the print system.

2. Related Art

In the related art, as a paper printer, a sticky note printer for printing print data on the surface of a fed sticky note is known. This sticky note printer feeds an ink ribbon in synchronization with the feed of the sticky note, inserts the sticky note and the ink ribbon between a platen roller and a thermal head, and performs printing on the sticky note by heat driving of the thermal head while feeding the sticky note and the ink ribbon in the same direction. In this case, the platen roller also functions as a feed roller for feeding the sticky note, and the feed roller and a winding shaft for winding the ink ribbon are driven by a single motor (JP-A-2003-11437).

However, in the sticky note printer, since the sticky note and the ink ribbon are fed together in a state that the sticky note and the ink ribbon are inserted between the platen roller and the thermal head at the time of printing, the ink ribbon is fed even when a blank portion of the sticky note, on which printing is not to be performed, is fed. Accordingly, the ink ribbon is needlessly wasted. In order to reduce such waste, it may be considered that the feeding of the ink ribbon is stopped when a blank portion is being fed. However, in this case, the surface of the sticky note may be affected by friction between the sticky note and the ink ribbon or the ink ribbon may be forcedly ejected

SUMMARY

An advantage of some aspects of the invention is that it provides a print system, a paper printer, and a method of controlling the print system, which are capable of suppressing wastage of an ink ribbon without influencing printing on paper.

According to an aspect of the invention, there is provided a print system including: a paper feed device which feeds paper; a print device which has a platen roller and a print head and inserts the fed paper and an ink ribbon at a head position between the platen roller and the print head to perform printing; a disjunction device which relatively moves the platen roller with respect to the print head between a contact position where the platen roller contacts the print head and a separation position where the platen roller does not contact the print head; a non-print section acquiring device which acquires non-print section data of a character image in a feed direction of the paper from print data including the character image having at least one character printed on the paper and positional data of the character image on the paper; and a print control device which controls the paper feed device, the print device, the disjunction device and the non-print section acquiring device, wherein the print control device relatively moves the plate roller to the separation position for a period during which a non-print section of the fed paper passes through the print head, on the basis of the non-print section data.

In this case, the print system may include a detection device which detects that the platen roller has relatively moved to the separation position with respect to the print head; and a ribbon feed device which feeds the ink ribbon along with the fed paper, and the print control device may control the ribbon feed device to stop the feed of the ink ribbon when the detection device detects that the platen roller has relatively moved to the separation position.

According to another aspect of the invention, there is provided a method of controlling a print system including a paper feed device which feeds paper; a print device which has a platen roller and a print head and inserts the fed paper and an ink ribbon at a head position between the platen roller and the print head to perform printing; and a disjunction device which relatively moves the platen roller with respect to the print head between a contact position where the platen roller contacts the print head and a separation position where the platen roller is separated from the print head; the method including: acquiring non-print section data of a character image in a feed direction of the paper from print data including the character image printed on the paper and positional data of the character image on the paper; and relatively moving the plate roller to the separation position for a period during which a non-print section of the fed paper passes through the print head, on the basis of the acquired non-print section data.

By this configuration, when the non-print section in the feed direction of the paper is made to approach the print head, the space between the print head and the platen roller is opened and the paper is fed in a state that the ink ribbon is stopped. Accordingly, since the ink ribbon is not fed in the non-print section, the waste of the ink ribbon corresponding to the length of the non-print section can be suppressed and the running cost of the user can be reduced. Since the paper and the ink ribbon are fed in a state that the paper and the ink ribbon are separated from each other, the surface of the paper not contaminated by friction between the paper and the ink ribbon or the ink ribbon is not forcedly extracted.

Since the detection device can accurately detect that the platen roller is moved to the separation position, the control can be performed with high precision by performing the control on the basis of the detected result. For example, a false operation in which the paper is fed in a state that a blank portion of the paper contacts the print head due to failure of the disjunction device can be prevented with certainty. When power supply is stopped during the operation, since the position of the platen roller can be more accurately identified when power is supplied again, appropriate control can be performed when the operation resumes.

In this case, the ribbon feed device may include a ribbon winding shaft on which the ink ribbon is wound; a driving device which is a driving source; a clutch device which transmits a driving force of the driving device to the ribbon winding shaft or blocks the driving force from being transmitted to the ribbon winding shaft according to the movement of the platen roller, and the clutch device may separate the platen roller from the contact position by the disjunction device and block the driving force to stop the feed of the ink ribbon.

By this configuration, when the platen roller is moved to the contact position, the driving force is transmitted to the driving device to the ribbon winding shaft to feed the ink ribbon. When the platen roller is separated from the contact position, the driving force is blocked from being transmitted to the ribbon winding shaft and the feed of the ink ribbon is stopped. That is, the print control device controls the move-

ment of the platen roller by the disjunction device such that the feed and the stop of the ink ribbon can be controlled.

In this case, the print system may further include a feed amount calculating device which calculates a paper feed amount from a time point when the paper feed device starts to feed the paper, on the basis of the non-print section data, and the print control device may control the non-print section to approach the print head, on the basis of the calculated paper feed amount.

By this configuration, it is possible to control the feed of the ink ribbon to be stopped by the length of the non-print section from a time point when the non-print section is made to approach the print head on the paper feed amount of the paper feed device and to control the platen roller to move to the separation position.

In this case, the feed amount calculating device may calculate the paper feed amount from a print dot number.

By this configuration, the control can be performed with high precision on the basis of the dot number.

In this case, the paper feed device may have any one of a stepping motor and an encoder-equipped motor, and the feed amount calculating device may calculate the paper feed amount from a rotation amount of the motor.

By this configuration, the control can be performed according to the rotation amount of the motor and thus the control can be easily performed.

In this case, the feed amount calculating device may calculate the paper feed amount from a paper feed speed and a paper feed time of the paper feed device.

By this configuration, since the paper feed distance is calculated from the paper feed speed and the paper feed time, the control can be performed on the basis of the paper feed distance. Accordingly, the control can be easily performed.

In this case, a plurality of non-print sections may include at least one of a front blank section and a back blank section of the paper.

By this configuration, it is possible to suppress the waste of the ink ribbon corresponding to the lengths of the front blank and the back blank of the paper.

In this case, the paper may be a sticky note which is separated from a bundle of sticky notes including a plurality of sticky notes one end of which is respectively pasted.

By this configuration, the front and back blanks of the sticky note are larger than those of a regular paper. Accordingly, a wider handwriting space may be formed in the front and back blank. Even when the bundle of sticky notes are stored to be reversed by mistake, the sticky note can be fed in a state that the paste portion of the sticky note are separated from the ink ribbon, by setting the blank (non-print section) of the sticky note in the feed direction to be wider than the paste portion of one end of the sticky note.

In this case, the print system may include a paper printer including the paper feed device, the ribbon feed device, the print device, the disjunction device, and the detection device; and an information processing terminal which includes the non-print section acquiring device, the print control device, and the feed amount calculating device, connects to the paper printer, and performs an information process including control of the paper printer.

By this configuration, the paper printer can accurately perform print control without performing a complicated information process. Accordingly, the configuration of the paper printer can be simplified and the small size and the low cost of the paper printer can be realized.

According to another aspect of the invention, there is provided a paper printer including all devices of the print system.

By this configuration, the paper printer can perform printing while suppressing the waste of the ink ribbon, without influencing the printing on the paper.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be described with reference to the accompanying drawings, wherein like numbers reference like elements.

FIG. **1** is a view showing the entire configuration of a sticky note print system.

FIG. **2** is an appearance perspective view of a sticky note printer.

FIG. **3** is a schematic view showing an example of the cross section of the sticky note printer.

FIG. **4** is a schematic view showing another example of the cross section of the sticky note printer.

FIGS. **5**A and **5**B are schematic views showing a clutch device and a deceleration gear train.

FIG. **6** is a control block diagram of the sticky note print system.

FIG. **7**A is a view showing non-print section data indicating a single non-print section of a character image and FIG. **7**B is a view showing non-print section data indicating a plurality of non-print sections of a character image.

FIG. **8** is a flowchart showing a print process using the sticky note print system.

FIGS. **9**A to **9**H are views showing a series of operations of the sticky note printer.

FIG. **10** is a schematic view showing an example of the cross section of a sticky note printer according to a second embodiment.

FIGS. **11**A to **11**H are views showing a series of operations of the sticky note printer according to the second embodiment.

DESCRIPTION OF EXEMPLARY EMBODIMENTS

Hereinafter, a print system according to a first embodiment of the invention will be described using a sticky note print system with reference to the accompanying drawings. In the sticky note print system according to the invention, a ribbon cartridge, in which an ink ribbon is stored, is detachably mounted, the ink ribbon is fed along with a sticky note while feeding the sticky note from a bundle of sticky notes, and the feed of the ink ribbon is stopped in accordance with feed of a non-print section such as a blank portion, on the basis of print data edited by a personal computer.

First, the configuration of the sticky note print system **1** (print system) will be described with reference to FIG. **1**. The sticky note print system **1** includes a sticky note printer **2** (paper printer) in which a sticky note bundle H is stored and a personal computer **4** (control terminal), which is connected to the sticky note printer **2** via a USB cable **3**, for preparing and editing print data which will be printed on a sticky note H**1** and controlling a variety of driving operations of the sticky note printer **2**.

The personal computer **4** includes a personal computer body **5**, a keyboard **6** and mouse **7**, which are connected to the personal computer body **5** so as to allow input of data, and a display **8** for displaying an input result. In the personal computer body **5**, a CD-ROM **9** for storing data such as a device driver or application software of the sticky note printer **2** is mounted. When a variety of detection signals, a variety of instructions, or a variety of data is input via the keyboard **6**, the personal computer **4** processes the variety of data accord-

ing to a program stored in the CD-ROM **9** to control the sticky note printer **2**. For example, in the present embodiment, non-print section data detailing sections on which printing is not to be performed on the sticky note H**1** is calculated from the print data by the application software stored in the CD-ROM **9** (described later) and is transmitted to the sticky note printer **2** to control the printing.

A function for controlling each unit may be provided in the sticky note printer **2** such that the printing is performed on the basis of the print data prepared and edited by the personal computer **4** or a function for controlling each unit or a function for preparing and editing the print data may be provided in the sticky note printer **2** such that the printing is performed on the sticky note H**1** using the sticky note printer **2** as a single body.

As shown in FIG. **2**, the outer shell of the sticky note printer **2** is formed by a device casing **11** and the inside of the device casing **11** is configured such that the sticky note bundle H can be stored therein. The sticky note printer **2** prints a desired character image P (see FIG. **7**) prepared by the personal computer **4** on the sticky notes H**1** separated from the sticky note bundle H one by one and ejects the sticky note via an ejection slot **12** formed in the device casing **11**.

The device casing **11** is formed to have a small size. A sticky note insertion opening **13** for allowing insertion of the below-described sticky note holder **21** from the front side of the casing into the casing in a draw-out type is formed in the lower portion of the front surface of the device casing **11**. The horizontal-slit-shaped ejection slot **12** for ejecting the sticky note H**1**, on which the printing has been completed, to the outside of the casing is formed in the central portion of the front surface of the casing. A ribbon cartridge C for receiving the ink ribbon R is mounted and an openable cover **14** for maintenance is attached on the surface of the device casing **11**.

As shown in FIG. **3**, the sticky note bundle H includes a plurality of sticky notes H**1**, the base end of the rear surface of each of which is partially pasted. The sticky notes H**1** can be separated from the sticky note bundle H one by one and can be adhered to a notebook via the paste portion H**1***b* of the base end thereof after separation.

The sticky note printer **2** includes the sticky note holder **21** for storing the sticky note bundle H, a sticky note feed device **22** (paper feed device) for lifting up an uppermost sticky note H**1** of the sticky note bundle H, separating the sticky note H**1**, and feeding the sticky note H**1** toward the ejection slot **12**, a print device **23** for performing printing on the fed sticky note H**1** with the thermal head **31** (print head) and the platen roller **32**, a ribbon feed device **24** for feeding the ink ribbon R provided for the printing, and a disjunction device **25** for disjunct the platen roller **32** to/from the thermal head **31**, all of which are mounted in the device casing **11**. The sticky note printer **2** further includes a detection sensor **26** (detection device) for detecting the separation of the platen roller **32** from the thermal head **31**.

The sticky note holder **21** includes a sticky note bundle casing **41** having an open surface and formed in a box shape and a mounting stage **42** which is mounted in the sticky note bundle casing **41** so as to horizontally mount the sticky note bundle H. A coil spring **43** for biasing the mounting stage **42** upwardly is interposed between the mounting stage **42** and the bottom surface of the sticky note bundle casing **41**. The sticky note holder **21** is mounted in the device casing **11** in the draw-out type and is detachably mounted via the sticky note insertion opening **13**. Accordingly, when the sticky note bundle H is to be replaced or exchanged, the sticky note holder **21** is drawn out and the sticky note bundle H is inserted.

The sticky note bundle casing **41** includes a surrounding frame-like casing body **44** for guiding the mounting stage **42** and position regulation units **45** which are provided at the upper end of the casing body **44** and protrudes inward so as to press a front end Ha and a base end Hb of the sticky note bundle H.

The mounting stage **42** is formed in a flat plate shape and is biased upwardly by the coil spring **43**. The sticky note bundle H is stored therein such that the height of the sticky note H**1** located at the uppermost position is constantly maintained by the position regulation units **45** although the sticky notes H**1** are fed one by one. At this time, the position of the sticky note bundle H stored therein becomes a pickup position **101** where the sticky note H**1** at the uppermost position is lifted up by the sticky note feed device **22**.

Accordingly, when the sticky note bundle H is stored on the mounting stage **42** from the top of the sticky note bundle casing **41**, the sticky note bundle H is biased upward by the coil spring **43** and the front end Ha and the base end Hb are regulated to be positioned at the pickup position **101** by the position regulation unit **45** in a state that the stick notes are mounted horizontally.

The sticky note feed device **22** includes a feed roller **51**, a driven roller **52**, a rotation arm **53**, a driving motor **54**, and a deceleration gear train **55** (power transmitting device). The feed roller **51** rolling-contacts the uppermost sticky note H**1** of the sticky note bundle H located at the pickup position **101**, lifts up and separates the sticky note H**1**, and inserting the turned-up sticky note H**1** between the driven roller **52** and the feed roller **51**. The rotation arm **53** moves the feed roller **51** between the pickup position **101** for lifting up the sticky note H**1** and the insertion position **102** for inserting the sticky note between the driven roller **52** and the feed roller **51**. The driving motor is a driving source of the feed roller **51** and the rotation arm **53** and the deceleration gear train **55** transmits a driving force of the driving motor **54** to the feed roller **51** and the rotation arm **53**. The driving motor **54** includes a counter **56** for measuring the feed amount of the sticky notes H**1** to increase the feed amount of the sticky notes H**1** one by one.

The feed roller **51** rolling-contacts the rear surface of the free end H**1***a* of the turned-up sticky note H**1** and separates, rotates and feeds the sticky note H**1** at the insertion position **102**, and has a roller body **61** which directly rolling-contacts the sticky note H**1** and a roller driving shaft **62** which is a central shaft for rotating the roller body **61**. Both sides of the roller driving shaft **62** are rotatably held at corresponding sides of the rotation arm **53** and the roller driving shaft **62** is rotated by the driving force of the driving motor **54** transmitted via the deceleration gear train **55**.

The rotation arm **53** rotatably holds the roller driving shaft **62** at the front end thereof and is rotated around the base end. The rotation arm **53** is moved between the pickup position **101** and the insertion position **102** by the driving force of the driving motor **54** transmitted via the deceleration gear train **55**.

The print device **23** has the thermal head **31** arranged in the vicinity of the ejection slot **12** and having the same width as the feed roller **51** and the platen roller **32** which faces the thermal head **31**. The platen roller **32** extends in the width direction of the sticky note H**1**. When the feed roller **51** is moved to the insertion position **102**, the platen roller **32** is rotated by the driving force from the driving motor **54** via the deceleration gear train **55** and performs the printing using the thermal head **31** while applying a feed force to the received

sticky note H1. Accordingly, it is possible to stably perform the printing on the sticky note H1. The platen roller **32** is moved between a contact position **103** which contacts the thermal head **31** and a separation position **104** which is separated from the thermal head **31**, by the below-described disjunction device **25** (see FIGS. **9**E and **9**G). The print device **23** having the above-described configuration performs the printing on the sticky note H1 while controlling the thermal head **31** and the driving motor **54** using the control signal from the personal computer **4**.

The ribbon feed device **24** has the ribbon cartridge C and a ribbon winding shaft **71** for winding the ink ribbon R of the mounted ribbon cartridge C. The ribbon winding shaft **71** is rotated by the driving force from the driving motor **54** via the deceleration gear train **55** when the feed roller **51** is moved to the insertion position **102** and the platen roller **32** is moved to the contact position **103**. The ribbon cartridge C includes a ribbon dispensing reel **72** around which the ink ribbon R is wound such that the ink ribbon may be freely dispensed, a ribbon winding reel **73** for winding the ink ribbon R, and a cartridge casing (not shown) for rotatably receiving the reels therein.

When the openable cover **14** is opened and the ribbon cartridge C is mounted, the ink ribbon R is inserted between the thermal head **31** and the platen roller **32** and the ribbon winding reel **73** is pivotally supported by the ribbon winding shaft **71**. When the printing is started by the print device **23**, the ribbon winding shaft **71** starts the winding (feed) of the ink ribbon R along with the feed of the sticky note H1.

The disjunction device **25** includes a support arm **81** for supporting the platen roller **32**, a plate cam **82** for pressing the upper end surface of the support arm **81** downwardly, and a disjunction motor **83** for rotating the plate cam **82**. The disjunction motor **83** is controlled by the personal computer **4**. The support arm **81** is pulled up by a return spring (not shown) such that the platen roller **32** is made to approach the contact position **103**, and a platen shaft portion which protrudes in the width direction of the sticky note H1 and supports the platen roller **32** is provided on the side surface of the support arm **81**. The base end of the support arm **81** is rotatably supported by a rotation support shaft **84** fixed to the device casing **11**.

When the disjunction motor **83** is driven, the plate cam **82** is half-rotated such that a protrusion thereof presses the upper end surface of the support arm **81** downwardly, and the platen roller **32** is made to approach the separation position **104**. Thereafter, when the plate cam **82** is half-rotated, the protrusion of the plate cam **82** is moved upward and the platen roller **32** is returned to the contact position **103** by the return spring. The platen roller **32** is rotated between the contact position **103** and the separation position **104** around the base end of the support arm **81**. Instead of the plate cam **82** and the disjunction motor **83**, a solenoid **86** may disjunct the platen roller **32** to/from the thermal head **31** (see FIG. **4**). In this case, the solenoid **86** is controlled by the personal computer **4** and is configured to press the upper end surface of the support arm **81** downwardly.

Now, the gear train structure (deceleration gear train **55**) of the ribbon feed device **24** and the platen roller **32** will be described in detail with reference to FIG. **5**A. The deceleration gear train **55** transmits the driving force of the driving motor **54** to the feed roller **51**, the rotation arm **53**, the platen roller **32**, and the ribbon winding shaft **71** and includes planetary gears. The deceleration gear train **55** includes a major sun gear **91** which is rotated by the driving force of the driving motor **54** and has a largest diameter, a first planetary gear **92** engaged with the major sun gear **91**, a first intermediate gear **93** which disjunct from the first planetary gear **92**, a second planetary gear **94** engaged with the first intermediate gear **93** using the first intermediate gear **93** as a sun gear, a second intermediate gear **95** which disjunct from the second planetary gear **94**, a third intermediate gear **96** engaged with the second intermediate gear **95**, and a fourth intermediate gear **97** engaged with the third intermediate gear **96**.

The major sun gear **91** is provided on the same shaft as the base end of the rotation arm **53** and the first planetary gear **92** outputs the driving force to the feed roller **51** provided on the same shaft. One side of the rotation arm **53** becomes a carrier of the first planetary gear **92** having the same shaft as the major sun gear **91**. That is, a position where the first planetary gear **92** is engaged with the first intermediate gear **93** becomes the insertion position where the feed roller **51** contacts the driven roller **52** and a position where the first planetary gear **92** is separated from the first intermediate gear **93** and the rotation arm **53** becomes horizontal becomes the pickup position **101**. Accordingly, the rotation arm **53** is rotated between the pickup position **101** and the insertion position **102** such that the feed roller **51** is rotated and is moved. The rotation of the rotation arm **53** is performed by an end surface cam not shown in the figure using the driving motor **54** as a driving source.

The first intermediate gear **93** is provided on the same shaft as the rotation support shaft **84** for supporting the support arm **81**, and the second planetary gear **94** outputs the driving force to the platen roller **32** provided on the same shaft. A portion of the support arm **81** becomes a carrier of the second planetary gear **94** having the same shaft as the first intermediate gear **93**. That is, a position where the second planetary gear **94** is engaged with the second intermediate gear **95** becomes the contact position **102** where the platen roller **32** contacts the thermal head **31**, and a position where the second planetary gear **94** is separated from the second intermediate gear **95** becomes the separation position **104**. Accordingly, the platen roller **32** is rotated at the contact position **103** and the separation position **104**.

The driving force transmitted to the second intermediate gear **95** is transmitted to the fourth intermediate gear **97** via the third intermediate gear **96** and the fourth intermediate gear **97** outputs the driving force to the ribbon winding shaft **71** provided on the same shaft. That is, the driving force is indirectly input from the second intermediate gear **95** to the ribbon winding shaft **71**. Since the fourth intermediate gear **97** adjusts a rotation direction, the ribbon winding shaft **71** is not limited to this configuration. The configuration in which the driving force is directly input from the second intermediate gear **95** to the ribbon winding shaft **71**, that is, the configuration in which the ribbon winding shaft **71** is provided on the same shaft as the second intermediate gear **95**, may be used.

When the driving motor **54** is rotated in a state that the platen roller **32** is made to approach the contact position **103**, the feed roller **51** located at the pickup position **101** is moved to the insertion position **102** while rotating. When the feed roller **51** is made to approach the insertion position **102**, the first planetary gear **92** is connected to the first intermediate gear **93** such that the driving force of the driving motor **54** is transmitted to the platen roller **32** and the driving force is transmitted to the ribbon winding shaft **71** via the second intermediate gear **95** and the third intermediate gear **96**. In contrast, in a state that the platen roller **32** is located in the separation position **104** (see FIG. **5**B), the second planetary gear **94** is separated from the second intermediate gear **95** and the driving force is not transmitted to the ribbon winding shaft **71**. Accordingly, when the platen roller **32** is separated from the contact position **103**, the winding of the ink ribbon R by

the ribbon feed device **24** is stopped. That is, a clutch device described in claims corresponds to the second planetary gear **94**.

The detection sensor **26** is provided below the support arm **81** and includes a micro-switch. Accordingly, when the support arm **81** is moved downwardly via the plate cam **82** such that the platen roller **32** is made to approach the separation position **104**, the lower end surface of the support arm **82** contacts the front end of the detection sensor **26** and detects the movement of the platen roller **32** to the separation position **104**. By this configuration, the sticky note H**1** is not idly fed in a state that the thermal head **31** and the platen roller **32** contact each other, due to mechanical failure. The detection sensor **26** is not limited to the micro-switch and an optical sensor such as a photo-interrupter may be used.

Now, a control system of the sticky note print system **1** will be described with reference to FIG. **6**. The sticky note print system **1** controls the information process and a variety of drives of the sticky note printer **2** by the personal computer **4**. The sticky note printer **2** includes a print unit **111** for performing the print using the thermal head **31**, a feed unit **112** for separating a sticky note H**1** from the sticky note bundle H and sending the sticky note to the outside of the device, a disjunction unit **113** for moving the platen roller **32** between the contact position **103** and the separation position **104** using the disjunction motor **83**, and a detection unit **114** for detecting the movement of the platen roller **32** to the separation position **104** using the detection sensor **26**. The personal computer **4** includes a operation unit **115** and a control unit **116**. The operation unit **115** functions as a user interface for inputting data via the keyboard **6** and the mouse **7** or displaying a variety of information on the display **8**. The control unit **116** controls the information process of the sticky note printer **2**, the operation unit **115** and the units and controls the entire sticky note print system **1**. The personal computer **4** includes a non-print section acquiring device for acquiring non-contact section data from print data and a feed amount calculation device for calculating the feed amount of sticky notes on the basis of the print dot number of the print data from a time point when the sticky note feed device starts to feed the sticky note. The non-print section acquiring device and the feed amount calculation device configure the main unit by the control unit **116**.

The control unit **116** includes a central processing unit (CPU) **121**, a read only memory (ROM) **122**, a random access memory (RAM) **123**, a CD-ROM **9**, and an input/output controller (IOC) **124**, all of which are connected to one another by an internal bus **125**. When a variety of signal data is input from each unit of the sticky note print system **1** via the IOC **124**, the CPU **121** processes the variety of data in the RAM **123** on the basis of the input variety of signal data according to the application software stored in the CD-ROM **9** and outputs a variety of signal data to each unit of the sticky note print system **1** via the IOC **124**.

Now, a configuration for acquiring (converting) the non-print section data of a character image P from print data by the non-print section acquiring device will be described with reference to FIG. **7**A. The print data includes the character image P and positional data of the character image P. A front blank dot number L**1** from the front end of the sticky note H**1** to a print start position **131** where the print of an initial character image P starts and a back blank dot number L**3** from a print end position **132** where the printing of a last character image P is completed to the back end of the sticky note H**1** are acquired from the positional data of the character image P. The value of the front blank dot number L**1** becomes a print start dot number Xa in which the printing starts with respect to the sticky note H**1**. Next, a character print dot number L**2** corresponding to a print section is acquired from the length of the feed direction of the character image P, the character print dot number L**2** and the front blank dot number L**1** are added to calculate a print end dot number Xb in which the printing is completed with respect to the sticky note H**1**. The front blank dot number L**1**, the character print dot number L**2** and the back blank dot number L**3** are added to calculate a total feed dot number Xc from the front end to the back end of the sticky note H**1**. That is, the print start dot number Xa from a time point when the front end of the feed direction of the sticky note H**1** is made to approach the thermal head **31** to a time point when the print start position **131** is made to approach the thermal head **31** and a value (Xc−Xb) obtained by subtracting the print end dot number Xb from the total feed dot number Xc from a time point when the print end position **132** is made to approach the thermal head **31** to a time point when the sticky note H**1** is ejected becomes the non-print section data.

Now, a control flow will be described with reference to FIG. **8**. When a user instructs the print (S**01**), the platen roller **32** is moved to the separation position **104** and the print start dot number Xa and the print end dot number Xb are acquired by the non-print section acquiring device (S**02** and S**03**). The note is fed by the sticky note feed device **22** until the front end of the sticky note H**1** is made to approach the thermal head **31** and the count Cn of the counter **56** of the sticky note feed device **22** is reset (S**04**). At this time, the counter **56** increases the feed amount of one dot of the sticky note H**1** one by one (S**05**). The sticky note feed device **22** feeds the sticky note H**1** until the count Cn reaches the print start dot number Xa (S**06**). That is, the sticky note H**1** is fed in a state that the platen roller **32** and the thermal head **31** are opened a duration from a time point when the front end of the sticky note H**1** is made to approach the thermal head **31** to a time point when the printing starts with respect to the sticky note H**1**. When the platen roller **32** is located at the separation position **104** as described above, the driving force of the driving motor **54** is not transmitted to the ribbon winding shaft **71** and thus the feed of the ink ribbon R is stopped.

Subsequently, when the count Cn exceeds the print start dot number Xa, the disjunction device **25** moves the platen roller **32** to the contact position **103** (S**07**). Then, the print and the feed of the sticky note are performed (S**08**). The sticky note feed device **22** feeds the sticky note H**1** while printing until the count Cn reaches the print end dot number Xb (S**09**). That is, the sticky note H**1** is sent in a state the sticky note H**1** is inserted between the platen roller **32** and the thermal head **31** from the print start to the print end of the sticky note H**1**. At this time, since the platen roller **32** is located at the contact position **103**, the driving force of the driving motor **54** is transmitted to the ribbon winding shaft **71** and thus the ink ribbon R feeds along with the sticky note H**1**.

When the count Cn exceeds the print end dot number Xb, the disjunction device **25** moves the platen roller **32** to the separation position **104** (S**10**). Accordingly, the platen roller **32** and the thermal head **31** are opened and thus the feed of the ink ribbon R is stopped. In this state, the sticky note H**1** is fed until the count Cn reaches the total feed dot number Xc and is ejected via the ejection slot **12** (S**11**). If the front blank dot number L**1** and the back blank dot number L**3** do not reach predetermined setting values (dot numbers), the thermal head **31** and the platen roller **32** may be controlled not to contact and separated to/from each other.

Next, a series of operations for performing the printing and feed of the sticky note H**1** on the basis of the print control will be described with reference to FIG. **9**. In a print standby state,

the feed roller **51** is located at the pickup position **101** to rolling-contact the surface of the uppermost sticky note H**1** of the sticky note bundle H stored in the sticky note holder **21** (see FIG. **9**A).

Next, when the protrusion of the plate cam **82** is moved downwardly to press the support arm **81** and the detection sensor **26** detects that the platen roller **32** is moved to the separation position **104**, the feed roller **51** is rotated and the turn-up operation of the sticky note H**1** is started (see FIG. **9**B). When the feed roller **51** rolling-contacting the free end H**1***a* of the surface of the sticky note H**1** is rotated, the middle portion of the longitudinal direction of the sticky note H**1** is curved upwardly and thus the sticky note H**1** is lifted up. When the support arm **81** is pressed, the driving force is blocked from being transmitted to the ribbon winding shaft **71**.

When the feed roller **51** is moved upwardly while rotating to be separated from the sticky note bundle H immediately after the front end of the turned-up sticky note H**1** passes through the lower side of the feed roller **51**, the sticky note H**1** springs over the feed roller **51** by the rotation force of the feed roller **51** and the free end H**1***a* of the sticky note H**1** rides on the feed roller **51** (see FIG. **9**C).

Subsequently, the feed roller **51** on which the sticky note H**1** is laid is moved to (goes around) the insertion position **102** (see FIG. **9**D). When the feed roller **51** reaches the insertion position **102** such that the sticky note H**1** is inserted between the driven roller **52** and the feed roller **51**, the feed roller **51** separates the turned-up sticky note H**1** from the sticky note bundle H and the separated sticky note H**1** is fed to the thermal head **31** by the feed roller **51** and the platen roller **32** (see FIG. **9**E).

When the print section (print start position **131**) of the sticky note H**1** approaches the thermal head **31**, the protrusion of the plate cam **82** is moved upwardly, the support arm **81** is pulled up by a return spring, the platen roller **32** contacts the thermal head **31**, and the printing on the sticky note H**1** starts (see FIG. **9**F).

When the non-print section (print end position **132**) of the sticky note approaches the thermal head **31** (see FIG. **9**G), the protrusion of the plate cam **82** is moved downwardly again to press the support arm **81**. Then, the sticky note H**1** which the printing is completed is fed to the ejection slot **12** by the feed roller **51** and the platen roller **32**.

At a time point when the paste portion H**1***b* of the sticky note H**1** reaches the platen roller **32**, the feed roller **51** is moved downwardly from the insertion position **102** to the pickup position **101** (see FIG. **9**H). Thereafter, the user removes the sticky note H**1** ejected via the ejection slot **12** to obtain the printed sticky note H**1**.

In the sticky note print system **1** according to the present embodiment, when a plurality of non-print sections of the feed direction of the sticky note H**1** approach the thermal head **31**, the space between the thermal head **31** and the platen roller **32** is opened and the sticky note H**1** is fed in a state that the ink ribbon R is stopped. Accordingly, since the ink ribbon R is not fed in the non-print section, the waste of the ink ribbon R corresponding to the length of the plurality of non-print sections can be suppressed and the running cost of the user can be reduced. Since the sticky note H**1** and the ink ribbon R are fed in a state that the stick note H**1** and the ink ribbon R are separated from each other, the surface of the sticky note H**1** is not contaminated by friction between the sticky note H**1** and the ink ribbon R or the ink ribbon R is not forcedly extracted. Even when the sticky note bundle H is stored to be reversed by mistake, the paste portion H**1***b* of the sticky note H**1** can be fed in a state of being separated from the ink ribbon R by setting the blank (non-print section) of the feed direction of the sticky note H**1** to be wider than the paste portion H**1***b* of one end of the sticky note H**1**.

The feed amount calculating device may calculate the feed amount of the sticky notes by calculating the rotation amount of the motor or the feed speed and time of the sticky note H**1**, in addition to the print dot number. When the management is performed by the rotation amount of the motor, the control can be easily performed using a stepping motor or an encoder-equipped motor as the driving motor **54**. When the management is performed by the feed speed and the feed time, the feed distance of the sticky note H**1** is calculated by the feed speed and the feed time and the control can be performed on the basis of the feed distance.

As shown in FIG. **7**B, acquisition (conversion) of non-print section data when a plurality (three in the present embodiment) of character images P is printed on the sticky note H**1** will be described. In this case, the print start dot numbers Xa**1**, Xa**2** and Xa**3** from the front end of the sticky note H**1** to the start of the print of the initial character images P and the print end dot numbers Xb**1**, Xb**2** and Xb**3** are calculated with respect to the character images P from the positional data of the character images P. That is, in this case, Xa**1** corresponding to the value of the front blank dot number, Xa**2**-Xb**1** and Xa**3**-Xb**2** corresponding to the values of the non-print section dot numbers of the character images P, and Xc-Xb**3** corresponding to the value of the back blank dot number become the non-print section data. When the non-print section data does not reach a predetermined setting value (dot number), the thermal head **31** and the platen roller **32** may be controlled not to contact and separated to/from each other.

Although the sticky note bundle H is used in the present embodiment, a memo pad of which the fixed end surface is adhered may be used. Although the platen roller **32** is moved in the present embodiment, the thermal head **31** may move. When the ribbon feed device **24** is driven by another driving force, the driving force of the ribbon feed device **24** may be stopped on the basis of the detection of the detection sensor **26**.

The units (functions) of the sticky note print system **1** may be provided as a program. The program may be stored in a recording medium (not shown). As the recording medium, a CD-ROM, a flash ROM, a memory card (Compact Flash (registered trademark), Smart Media, Memory stick, or the like), an optical magnetic disk, a digital versatile disk, and a flexible disk may be used.

Next, a sticky note print system **1** according to a second embodiment will be described with reference to FIG. **10**. In order to avoid duplicated description, only different portions will be described. In the sticky note print system **1**, unlike the sticky note printer **2** according to the second embodiment, a platen roller **32** functions as the feed roller **51** and a presser roller **143** for retracting the platen roller **32** from the contact position is included. A rotation arm **53** includes a bearing portion **141** formed of an elongated opening and an energizing spring **142** for energizing the platen roller **32** to the contact position **103** in contact with a roller driving shaft **62**. A disjunction device **25** is provided in the vicinity of an ejection slot **12**, rolling-contacts the platen roller **32**, and includes a presser roller **143** for positioning the platen roller **32** at a separation position **104**, a roller movement device **144** for disjunct the presser roller **143** to/from the platen roller **32**, and the energizing spring **142**. A reception portion **145** which extends from the inside to the outside of the casing with the ejection slot **12** as a boundary therebetween and receives the sticky note H**1** from the platen roller **32** is formed at the front surface of the device casing **11**.

The roller movement device **144** is configured such that the presser roller **143** is made to approach a pressing position **151** (see FIG. **11**E) on a movement locus of the platen roller **32** which is moved between the pickup position **101** and the contact position **103** and includes a movement rod **161** for supporting the presser roller **143**, a plate cam **82** for pressing the upper end surface of the movement rod **161** downwardly, a disjunction motor **83** for rotating the plate cam **82**. The disjunction motor **83** is controlled by a personal computer **4**. The movement rod **161** is pulled up by a return spring (not shown) such that the presser roller **143** is made to approach a pressing release position **152** (see FIG. **11**F) shifted from the movement locus of the platen roller **32**. A detection boss **164** for switching a detection sensor **26** is formed on the movement rod **161**.

When the movement rod **161** is pressed such that the presser roller **143** is made to approach the pressing position **151**, the platen roller **132** slidably is moved to the lower side of the bearing portion **141** against the energizing spring **142** to be positioned at the separation position **104** (see FIG. **11**E). When the movement rod **161** is pulled up such that the presser roller **143** is made to approach the pressing release position **152**, the platen roller **32** slidably is moved to the upper side of the bearing portion **141** by the energization of the energizing spring **142** such that the plate roller **32** is made to approach the contact position **103** (see FIG. **11**F).

A series of operations for performing the printing and feed of a sticky note H**1** will be described with reference to FIG. **11**. In a print standby state, the platen roller **32** is located at the pickup position **101** and rolling contacts the surface of an uppermost sticky note H**1** of the sticky note bundle H stored in a sticky note holder **21** (see FIG. **11**A). The presser roller **143** is located at the pressing release position **152** and is separated from the platen roller **32**.

Next, when the protrusion of the plate cam **82** presses the presser roller **143** via the movement rod **161**, the detection boss **164** presses the detection sensor **26**. The personal computer **4** rotates the platen roller **32** and starts the turn-up operation of the sticky note H**1** when the detection sensor **26** detects the movement of the platen roller **32** to the separation position **104** (see FIG. **11**B). When the presser roller **143** is pressed, the driving force is blocked from being transmitted to a ribbon winding shaft **71**.

When the platen roller **32** is rotated, the sticky note H**1** springs over the platen roller **32** and thus the front end of the sticky note H**1** rides on the platen roller **32** (see FIG. **11**C).

Subsequently, the platen roller **32** on which the sticky note H**1** is laid is moved (goes) upwardly toward the contact position **103** while rotating (see FIG. **11**E). Then, the platen roller **32** is in contact with the presser roller **143** which is moved to the pressing position **152** to be positioned at the separation position **104**. When the platen roller **32** reaches the separation position **104** and the sticky note H**1** is inserted between the presser roller **143** and the platen roller **32**, the platen roller **32** separates the turned-up sticky note H**1** from the sticky note bundle H and the separated sticky note H**1** is fed toward the ejection slot **12** (see FIG. **11**E).

When the print section (print start position **131**) of the sticky note H**1** is made to approach the thermal head **31**, the protrusion of the plate cam **82** is moved upwardly to pull up the presser roller **143** via the movement rod **161** by the return spring, the platen roller **32** contacts the thermal head **31**, and the printing on the sticky note H**1** starts (see FIG. **11**F).

When the non-print section (print end position **132**) of the sticky note H**1** is made to approach the thermal head **31** (see FIG. **11**G), the protrusion of the plate cam **82** is moved downwardly again and presses the presser roller **143**. The sticky note H**1** on which the printing is completed is inserted between the presser roller **143** and the platen roller **32** and is fed to the ejection slot **12**.

At a time point when a paste portion H**1***b* of the sticky note H**1** reaches the platen roller **32** (see FIG. **11**H), the platen roller **32** is moved toward the pickup position **101** and the sticky note H**1** is sent to the reception portion **145**. Thereafter, a user removes the sticky note H**1** ejected via the ejection slot **12** to obtain the sticky note H**1**.

What is claimed is:

1. A print system comprising:

a paper feed device which feeds paper having a paste portion in a state that the paste portion faces backward in a feed direction of the paper;

a print device which has a platen roller and a print head and inserts the fed paper and an ink ribbon at a head position between the platen roller and the print head to perform printing;

a disjunction device which relatively moves the platen roller with respect to the print head between a contact position where the platen roller contacts the print head and a separation position where the platen roller does not contact the print head; and

a print control device which controls the paper feed device, the print device, and the disjunction device, wherein

the paper is a sticky note that is separated from a bundle of sticky notes including a plurality of sticky notes one end of which is respectively pasted,

the paper feed device has a feed roller that moves between a pickup position for lifting up the sticky note and an insertion position for inserting the sticky note with a driven roller,

the platen roller rotates when the feed roller moves to the insertion position, and

the print control device relatively moves the platen roller to the separation position and moves the feed roller to the pickup position for a period during which the paste portion of the fed paper passes through the platen roller position.

2. The print system according to claim **1**, further comprising:

a detection device which detects that the platen roller has relatively moved to the separation position with respect to the print head; and

a ribbon feed device which feeds the ink ribbon along with the fed paper,

wherein the print control device controls the ribbon feed device to stop the feed of the ink ribbon when the detection device detects that the platen roller has relatively moved to the separation position.

3. The print system according to claim **2**, wherein the ribbon feed device includes:

a ribbon winding shaft on which the ink ribbon is wound;

a driving device which is a driving source; and

a clutch device which transmits a driving force of the driving device to the ribbon winding shaft or blocks the driving force from being transmitted to the ribbon winding shaft according to the movement of the platen roller,

wherein the clutch device separates the platen roller from the contact position with the disjunction device and blocks the driving force to stop the feed of the ink ribbon.

4. The print system according to claim **2**, comprising:

a paper printer including the paper feed device, the ribbon feed device, the print device, the disjunction device, and the detection device; and

an information processing terminal which includes the print control device, and the feed amount calculating

device, connects to the paper printer, and performs an information process including control of the paper printer.

5. The print system according to claim **1**,

further comprising: a non-print section acquiring device which acquires non-print section data of a character image in a feed direction of the paper from print data including the character image having at least one character printed on the paper, positional data of the character image on the paper, and paste portion data of the paper,

wherein the print control device controls the disjunction device to move relatively the platen roller to the separation position based on the non-print section data.

6. The print system according to claim **5**,

further comprising a feed amount calculating device which calculates a paper feed amount from a time point when the paper feed device starts to feed the paper, on the basis of the non-print section data,

wherein the print control device controls the non-print section to approach the print head, on the basis of the calculated paper feed amount.

7. The print system according to claim **6**, wherein the feed amount calculating device calculates the paper feed amount from a print dot number.

8. The print system according to claim **6**,

wherein the paper feed device has any one of a stepping motor and an encoder-equipped motor,

wherein the feed amount calculating device calculates the paper feed amount from a rotation amount of the motor.

9. The print system according to claim **6**, wherein the feed amount calculating device calculates the paper feed amount from a paper feed speed and a paper feed time of the paper feed device.

10. The print system according to claim **6**, wherein a plurality of non-print sections include at least one of a front blank section and a back blank section of the paper.

11. A method of controlling a print system including a paper feed device having a feed roller which feeds paper having a paste portion in a state that the paste portion faces backward in a feed direction of the paper, wherein the paper is a sticky note that is separated from a bundle of sticky notes including a plurality of sticky notes one end of which is respectively pasted; a print device which has a platen roller and a print head and inserts the fed paper and an ink ribbon at a head position between the platen roller and the print head to perform printing; and a disjunction device which relatively moves the platen roller with respect to the print head between a contact position where the platen roller contacts the print head and a separation position where the platen roller is separated from the print head; the method comprising:

moving the feed roller between a pickup position for lifting up the sticky note and an insertion position for inserting the sticky note with a driven roller, wherein the platen roller rotates when the feed roller moves to the insertion position; and

relatively moving the platen roller to the separation position and moving the feed roller to the pickup position for a period during which the paste portion of the fed paper passes through the platen roller position.

* * * * *